



Greener and Cleaner:

How can environmental professionals incorporate consumer product safety into their daily work?

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Department of Toxic Substances Control



Cal/EPA

Course Outline

- Safer Consumer Products (SCP) Program Overview
- Candidate Chemical List
- Three Year Work Plan
- Priority Product Selection Process
- Alternatives Analysis Process
- Research Needs of the SCP Program
- Past Regulatory Success





California's Safer Consumer Products Program - Overview

Karl Palmer

Chief

NorCal SETAC Short Course

April 29, 2015



Department of Toxic Substances Control



Cal/EPA

For today:



- Why are we looking...in your closet, vanity, living room and fishing tackle box?
- The Safer Consumer Products program
 - What are we looking for?
 - How will “we” find it?
 - Then what?



Basics: Impetus for California's Program

- 2008 Green Chemistry Law
(AB 1879/SB 509)
- Address problems with chemical bans
 - Create a “framework” – Safer Consumer Product Regulations



Mission...

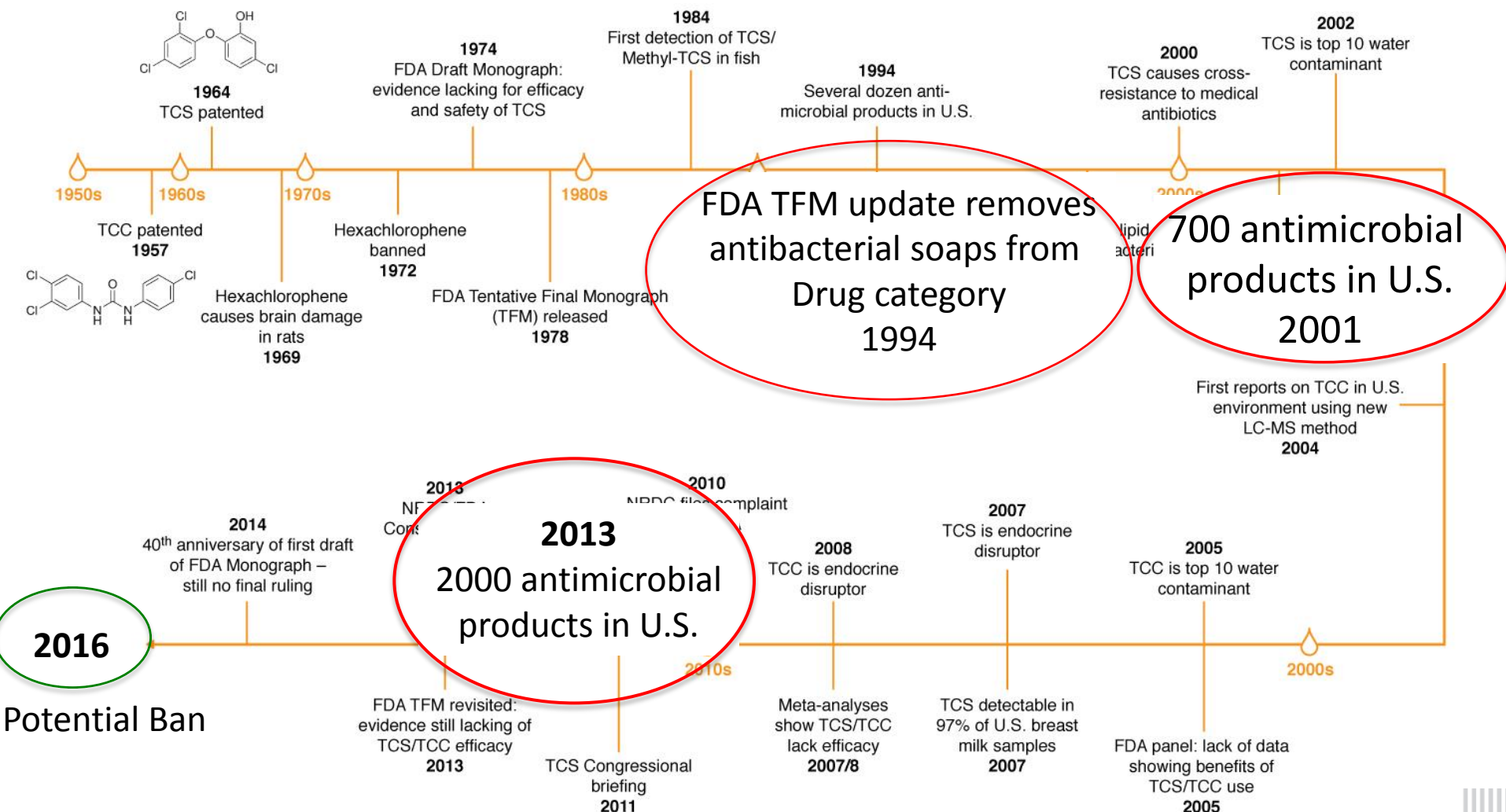


Purposes of the green chemistry legislation

- Reduce exposure
- Reduce or eliminate chemical hazards
- Look at full product lifecycle
- Encourage reformulation/innovation
- Avoid regrettable substitutes
- Independent of other regulations



Impact of Regulations on Chemical Usage (Good & Bad)



Basics: The Goal:

- Safer consumer products

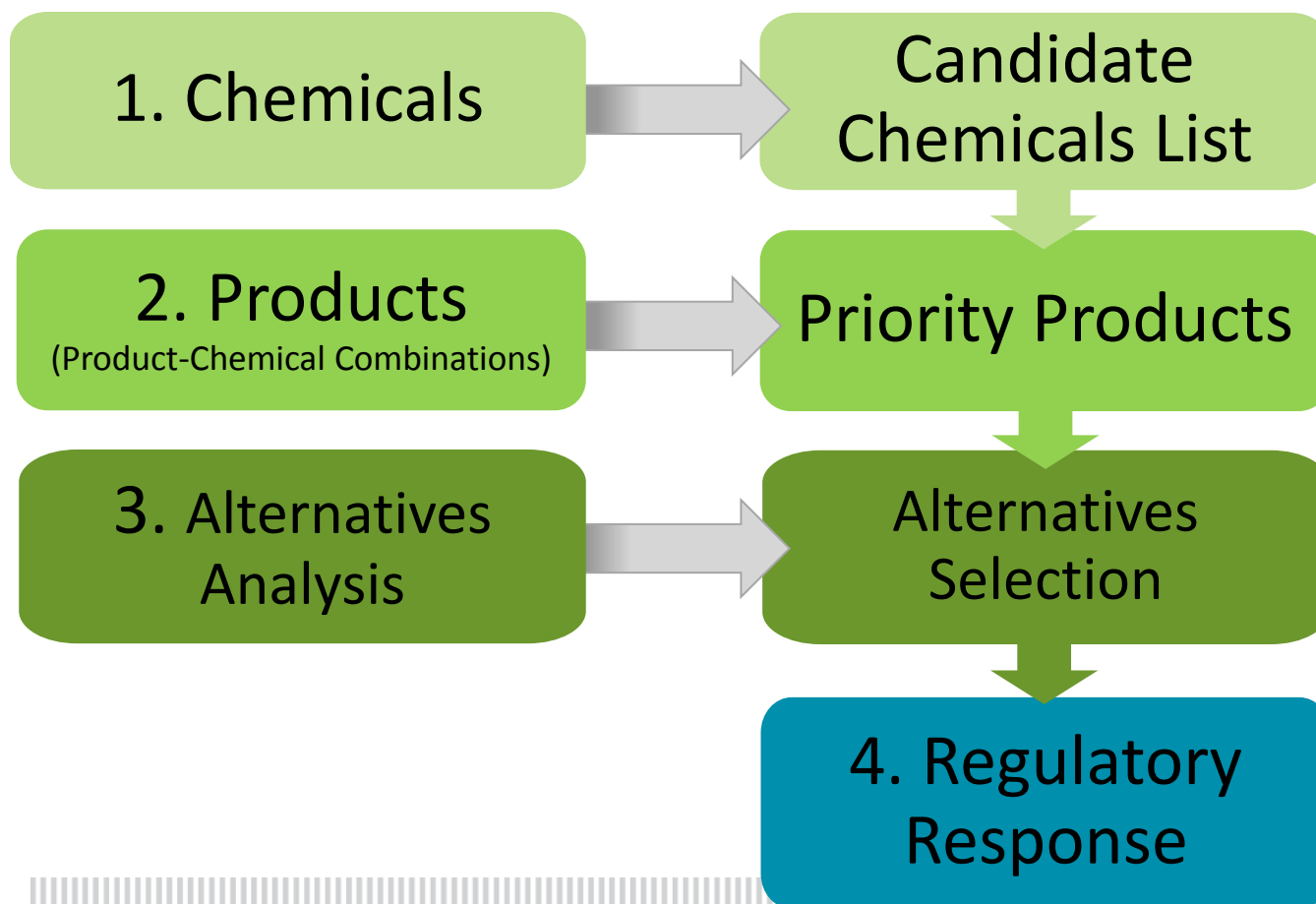


- Asks the questions:
 - Is this chemical necessary?
 - Is there a safer alternative?

- Greater market opportunities for innovative companies

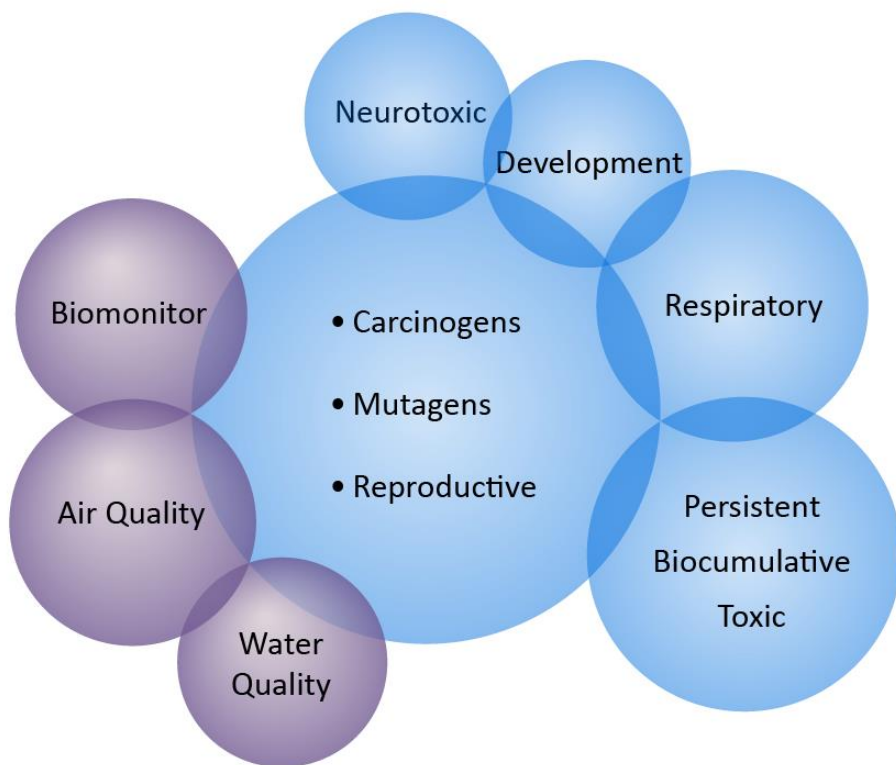


Four-step process



1. Candidate Chemicals

23 Authoritative Lists referenced



- 8 exposure potential lists (NHANES, CA Biomonitoring)
- 15 hazard trait lists (Prop 65, IARC)

Exclusions

- Pesticides, prescription drugs, and their breakdown products
- Radioactive chemicals
- Natural toxins

~2,300 Chemicals

<http://www.dtsc.ca.gov/SCP/ChemList.cfm>



2. Product Selection

- **Prioritization Principles for Picking Products:**

- Potential **exposure** to the Candidate Chemicals in the product

AND

- Potential for exposures to contribute to or cause **significant or widespread adverse impacts**



3. Alternatives Analysis

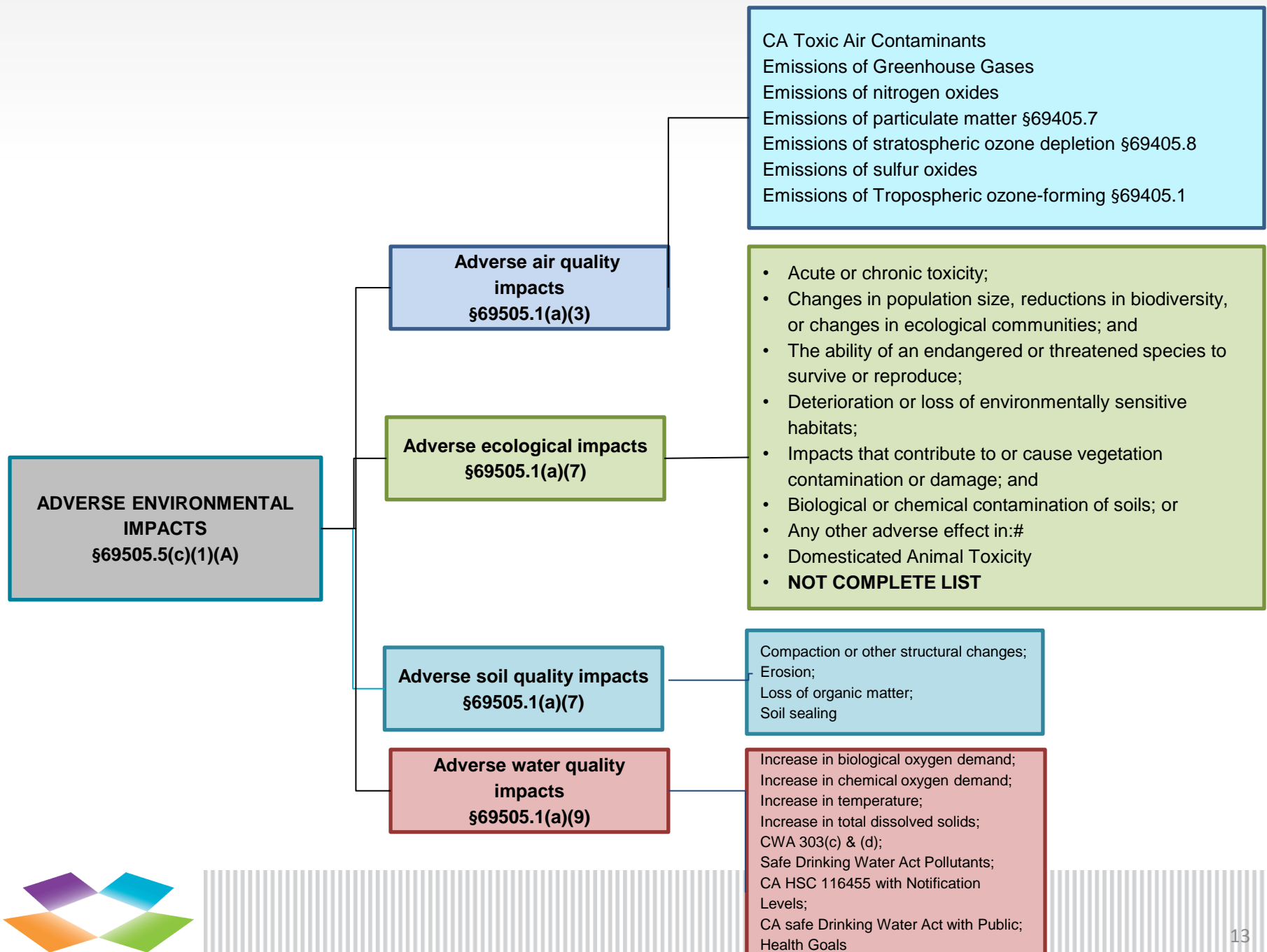
Answers key questions

- Is it necessary?
- Is there a safer alternative?
- Have regrettable substitutes been avoided?
- All relevant impacts throughout life cycle considered?

Life cycle thinking informs

- Regulated entities' decisions
- DTSC's regulatory response





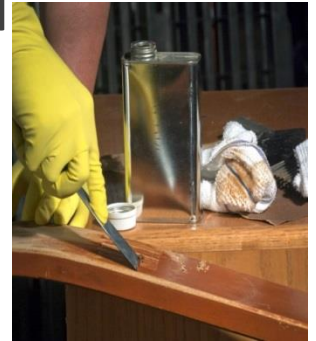
4. Regulatory Responses

- No response
- Additional information to DTSC
- Additional information to consumer
- Additional safety measures
- Restrictions/Prohibitions on sales
- End-of-life product stewardship
- Research funding



Initial Priority Products

1. Children's Foam-padded Sleeping Products containing TDCPP and TCEP
2. Paint Strippers containing Methylene Chloride
3. Spray Polyurethane Foam Systems with MDI



Priority Product Work Plan

- Identify product **categories** for next 3 years
- Provide market signals
- Engage stakeholders, gather data
- Identify potential Priority Products



Policy priorities

- Dermal, ingestion, inhalation exposure pathways
- Biomonitoring results
- Chemicals found in indoor air monitoring
- Sensitive subpopulations – children, workers
- Aquatic resource impacts
- Water quality monitoring evidence





**Beauty, Personal
Care and Hygiene
Products**



**Household/Office
Furniture/
Furnishings**



**Building Products –
Paint Products,
Adhesives, Sealants,
Flooring**



**Cleaning
Products**



**Fishing and Angling
Equipment**

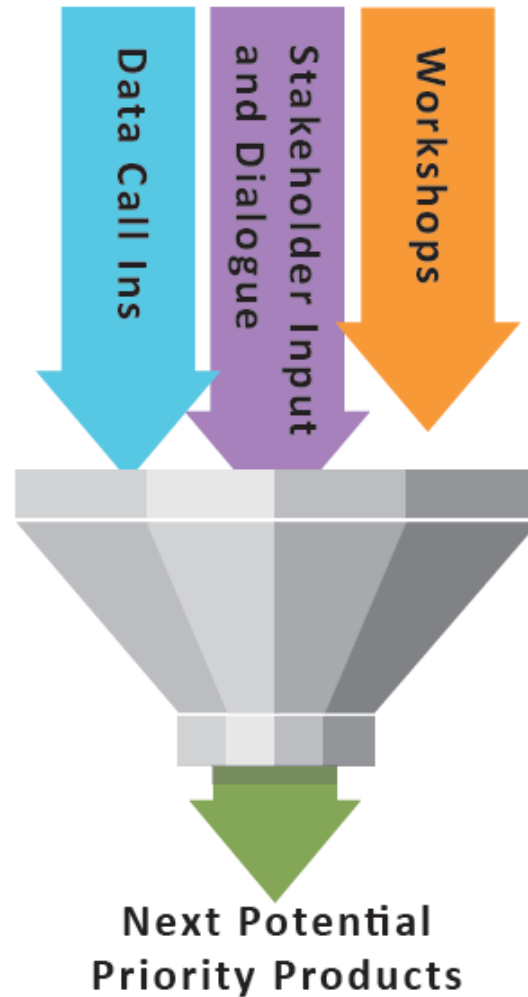


**Office Machinery
Consumable Products**

Clothing



Process of Priority Product Selection: Executing the Work Plan



What to watch for – 2015

- Alternative Analysis Guidance
- Notice for rulemaking on initial Priority Products
- Workshops, webinars, meetings on future potential Priority Products





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Thank you

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<http://www.dtsc.ca.gov/SCP>





Candidate Chemicals list: First step in identifying potential Priority Products

Daphne Molin

Environmental Scientist

NorCal SETAC short course

April 29, 2015

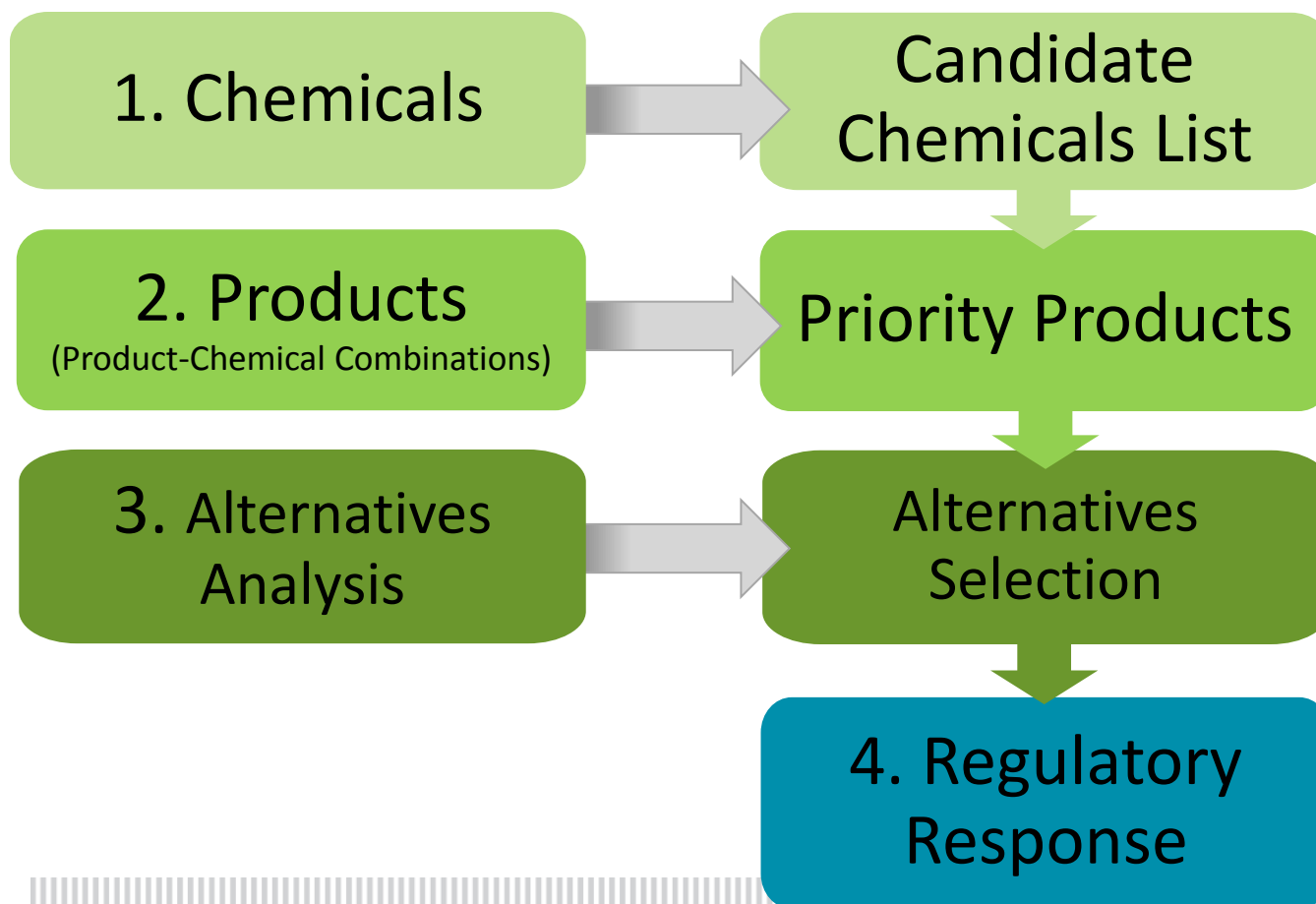


Department of Toxic Substances Control



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Four-step process



Presentation Outline

- Definitions
- Rationale of Approach
- Updates to the CC list
- Demo Database
- Information Gaps



Definitions

$$\begin{array}{rcl} & \text{Authoritative List} & \\ + & \text{Hazard Trait} & \\ \hline = & \text{Candidate Chemical}^* & \end{array}$$

* Chemicals can also be added by new regulation



Example Sources for Authoritative Lists (23)

Hazard Trait Related

- State: OEHHA
- Federal: ATSDR, IRIS, NTP
- International: EC CLP

Exposure Related

- Biomonitoring
- Water
- Air



Example Hazard Traits (40)

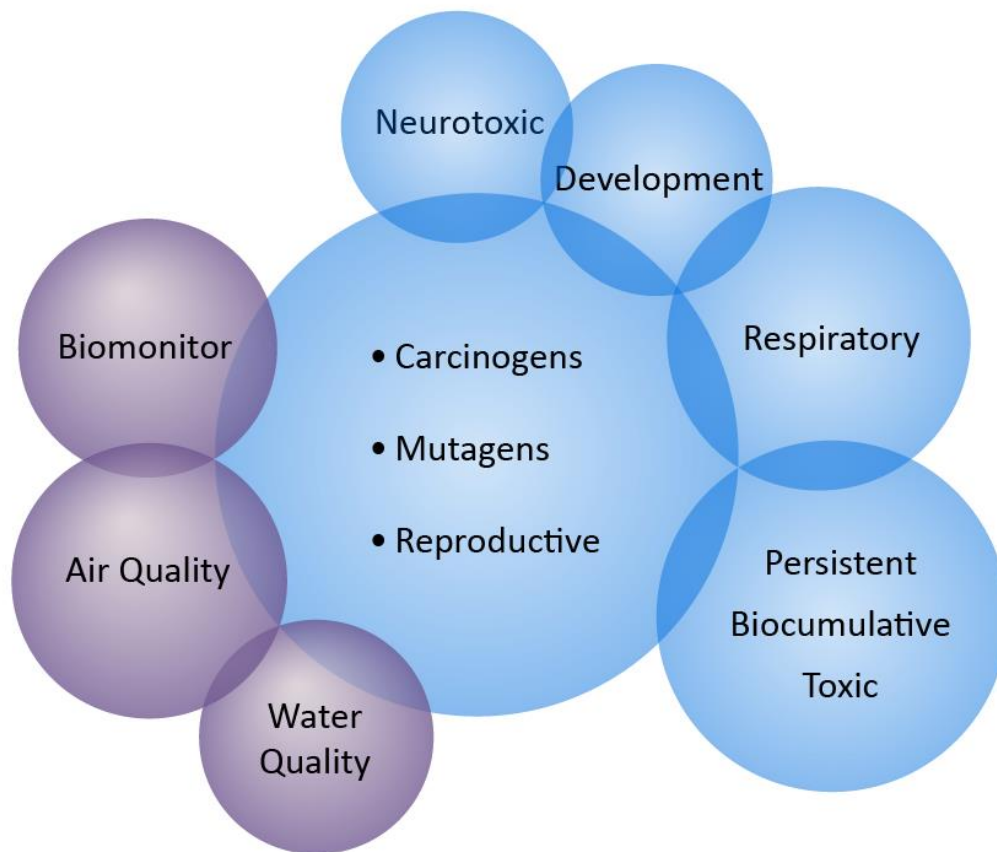
- Human: CMRs, Neurotox, Respiratory
- Environmental: wildlife reproduction impairment
- Exposure: bioaccumulation, environmental mobility
- Physical: flammability



Candidate Chemicals:

Hazard Traits & Exposure Indicators

(~1,100)



Implications of the Candidate Chemicals list

- DTSCs first step for investigating Chemicals of Concern in Priority Products.
- Not all Candidate Chemicals have harmful exposure pathways from consumer products



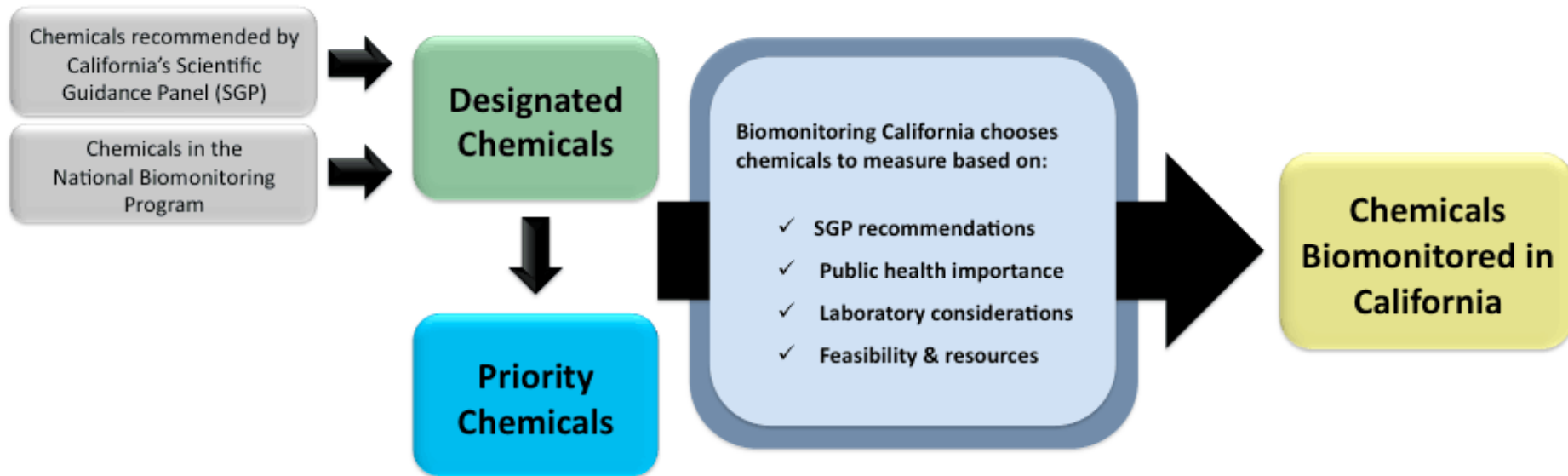
Rationale of Authoritative List Approach

- Quick start up for Program use
- Scientifically rigorous
 - Reputable sources, mostly government with public comment
- Transparent to stakeholders
 - Harmonize w/ other state programs
- Flexible and evolving
 - Several “living” lists



Processes to update the Authoritative Lists

■ Biomonitoring California



<http://biomonitoring.ca.gov/chemicals/chemical-selection>



Updates to the Candidate Chemicals list

Frequently

(several times since 10/2013)

- Prop 65
- CDC NHANES 4th Report
- CECBP Priority Chemicals

Periodically

(1-2 times since 10/2013)

- EC Annex VI: CMRs; Resp. Sens.
- ECHA SVHC Candidate List
- IARC Carcinogens: 1, 2A, 2B
- CA MCLs
- OEHHA RELs



Updates to the Candidate Chemicals list

Stable (no changes since 10/2013)

- ATSDR Neurotoxicants
- Canada PBiTs
- IRIS: Carcin., Likely Carcin.
- IRIS Neurotoxicants
- NTP 12th RoC: known, reasonable
- NTP OHAT: Repr. or Dev.
- US EPA NWMP PBTs
- US EPA TRI PBTs
- WA PBTs
- CA NLs
- CA TACs
- CWA 303(c)/303(d)
- OSPAR Priority Action Part A



Extent of changes to the Authoritative Lists

- Prop 65 (~40 additions or deletions)
- CECBP Priority Chemicals (8 additions)
- CA MCLs (1 addition)



Candidate Chemicals Database

- What chemicals are you curious about?
- What might be in consumer products?
- What hazard traits would you expect to find in those chemicals?



The screenshot displays the DTSC website header with the logo and navigation links: DTSC HOME and SAFER CONSUMER PRODUCTS. Below the header is a banner for the Safer Consumer Products (SCP) initiative, featuring a woman holding a product. The main content area includes a search button labeled "Search DTSC Candidate Chemical Database" and links to "Chemical Lists Homepage", "SCP Website", and "FAQ". A detailed paragraph explains the regulatory requirements for posting candidate chemicals, mentioning the effective date of October 1, 2013, and the criteria for listing, including chemical name, CAS number, hazard traits, and authoritative list names. It also notes that chemicals with hazard traits or environmental/toxicological endpoints are included. A section titled "Download Candidate Chemical List" is visible, followed by a search form with a text input field for "Search by Chemical Name and CAS RN", a "Search" button, and checkboxes for "Search Group Names" and "Show Only Initial List". Links for "New Search" and "More Search Options" are provided at the bottom of the search form.

California Department of
Toxic Substances Control

DTSC HOME SAFER CONSUMER PRODUCTS

SAFER
CONSUMER
PRODUCTS (SCP)

Search DTSC Candidate Chemical Database

[Chemical Lists Homepage](#) | [SCP Website](#) | [FAQ](#)

The Safer Consumer Products regulations require DTSC to post an informational list of Candidate Chemicals on its web site within 30 days after the effective date of the regulations (October 1, 2013); and to update the list periodically. (Cal. Code Regs, tit. 22, § 69502.3, subd. (a)). This list includes the chemical name, the Chemical Abstracts Service Registry Number (if applicable), the basis for listing the Candidate Chemical ([hazard trait](#) and [authoritative list name](#)), the [group name](#) (if applicable), and an indication of whether the chemical is on the "initial list of Candidate Chemicals."

Chemicals that exhibit a hazard trait and/or environmental or toxicological endpoint and are listed on one or more of the lists identified in section 69502.2(a) of title 22 of the California Code of Regulations are Candidate Chemicals. These are the chemicals that are identified on the informational Candidate Chemicals list. In the event there is a discrepancy between the criteria in section 69502.2 and the informational Candidate Chemicals list, the regulation controls.

The Chemical Abstracts Service Registry Numbers (CAS RNs) are listed as they are identified on the source list, therefore, a chemical may be identified using a synonymous name, and searching by CAS number whenever possible is recommended.

Download Candidate Chemical List

Search by Chemical Name and CAS RN

Search ☐ Search Group Names ☐ Show Only Initial List

[New Search](#) | [More Search Options](#)



Caveat: add chemicals via regulation

- Example criteria

- Hazard Trait
- Aggregate effects
- Cumulative effects

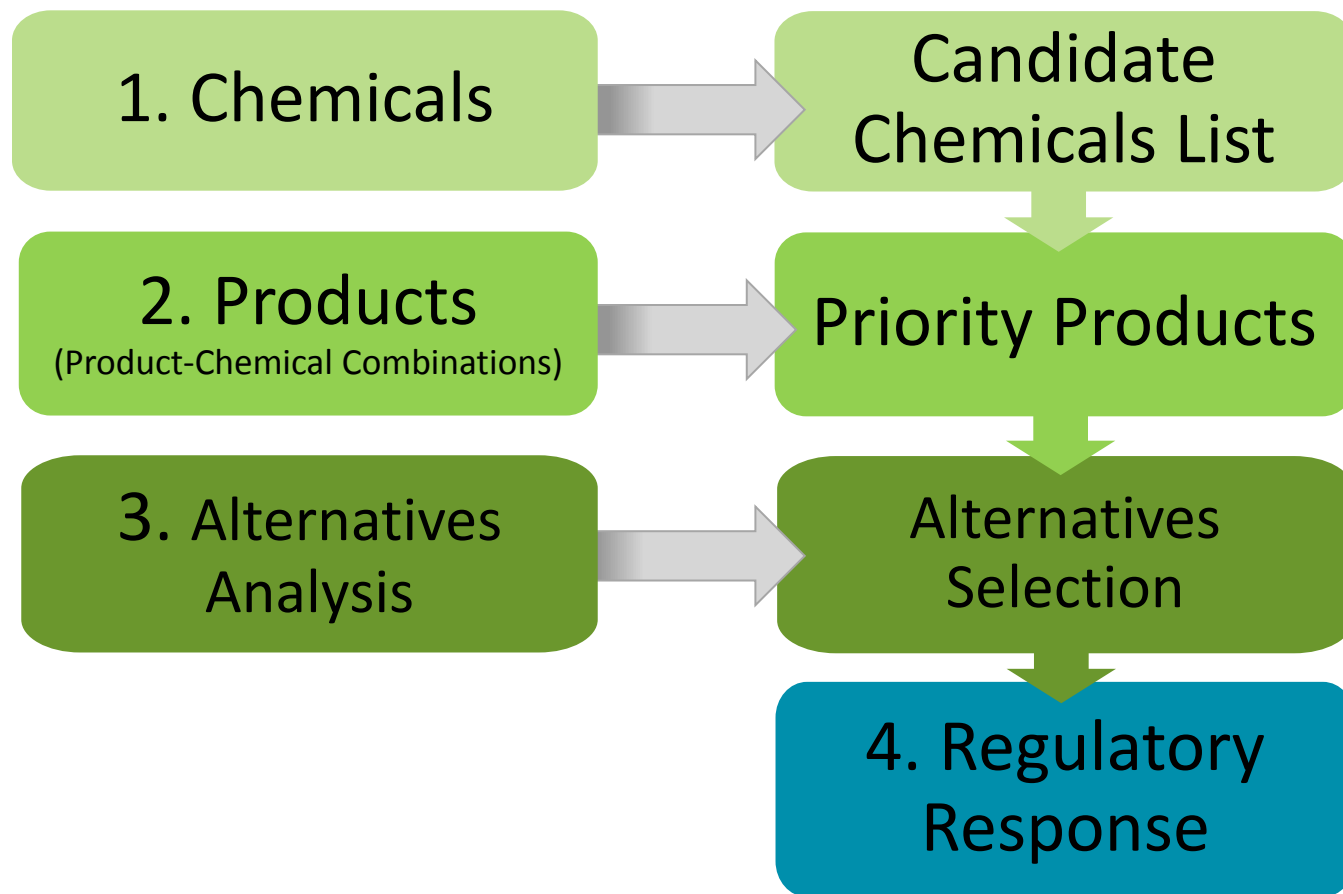
- Petition: <https://calsafer.dtsc.ca.gov/>

- Exclusions to program

- Consumer Product excludes pesticides, prescription drugs, food
- Non-chemicals



Next Steps for SCP



Information Gaps

- Hazard traits for biota
- Environmentally relevant chemicals
- “Emerging” chemicals with robust HTs
- Relevance of CCs to consumer products
 - Ingredients vs unintentionally added
 - Petroleum distillates



Questions?

CC list web page:

<http://www.dtsc.ca.gov/SCP/ChemList.cfm>

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Thank you!





Priority Product Work Plan

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NorCal SETAC Short Course
April 29, 2015



Department of Toxic Substances Control



Cal/EPA

Priority Product Work Plan

- Identify product *categories* for next 3 years
- Provide market signals
- Engage stakeholders, gather data
- Identify potential Priority Products

<http://www.dtsc.ca.gov/SCP/PPWP.cfm>



Policy Priorities

- Clear pathways for exposure to Candidate Chemicals
- Contain chemicals detected in biomonitoring studies
- Contain chemicals observed in indoor air/dust
- Impact children or workers
- Contain chemicals that may adversely impact aquatic resources or observed in water quality monitoring





**Beauty, Personal
Care and Hygiene
Products**



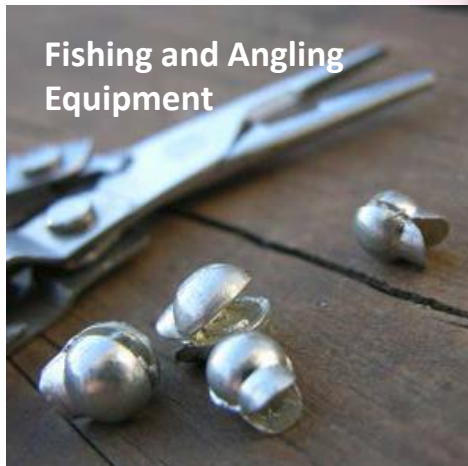
**Household/Office
Furniture/
Furnishings**



**Building Products –
Paint Products,
Adhesives, Sealants,
Flooring**



**Cleaning
Products**



**Fishing and Angling
Equipment**



**Office Machinery
Consumable Products**

Clothing



Beauty, Personal Care and Hygiene

- Products are applied directly to body
- Volume and frequency of use
- Ingredients are not always disclosed
- Biomonitoring
- Potential impacts on aquatic environment
- Examples:
 - Body wash and soaps
 - Deodorants
 - Lotions
 - Nail care products



Potential Candidate Chemicals in the Beauty, Personal Care and Hygiene Category

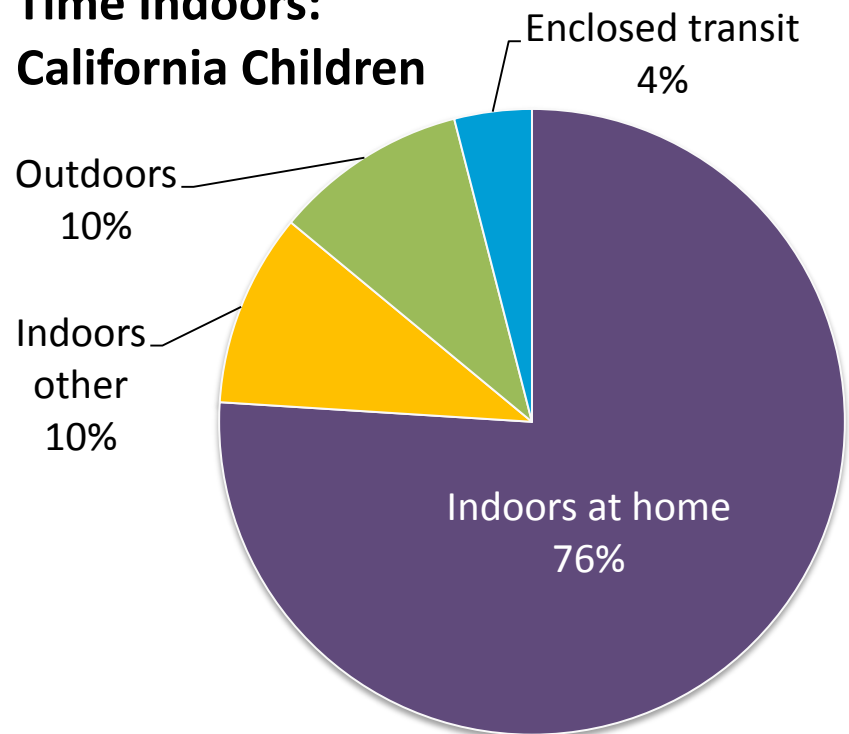
Chemicals or Chemical Classes	Functional Use
Aldehydes, formaldehyde	Cross-linking agent, modifier, preservative
Alkylphenol ethoxylates (APEs)	Surfactant
Azo dyes, coal tars, lead, and lead acetate	Colorant, dyes, pigment
Phthalates	Emulsifier, plasticizer
Triclosan	Antimicrobial
Toluene	Solvent



Building Products & Household/Office Furniture

- Direct pathways
 - inhalation of indoor air and ingestion of dusts
 - particularly by children
- Californians spend most of their time indoors

**Time Indoors:
California Children**



Jenkins *et al.*, 1992; Phillips *et al.* 1991



Building Products and Household/Office Furniture

- Greater exposure and impacts on children
 - Susceptible during development
 - Respiratory sensitivity
 - Time on floors
 - Fingers and objects in mouths



Building Products and Household/Office Furniture

- Clear evidence of chemical presence from biomonitoring and indoor air studies
- Potential Health Impacts:
 - Asthma
 - Cancer
 - Irritant effects



Building Products

Subcategories:

- Painting Products
- Adhesives
- Sealants
- Flooring

Examples:

- Paints and Primers
- Adhesives and Glues
- Carpeting
- Vinyl Flooring



Potential Candidate Chemicals in the Building Products Category

Chemicals or Chemical Classes	Functional Use
Brominated or chlorinated organic compounds, organophosphates	Flame retardant
Isocyanates	Reactant, precursor
Metals, such as Chromium VI	Dyes and Pigment
Perfluorochemicals	Repellent (water-, oil-, stain-)
Phthalates	Plasticizer
Volatile Organic Compounds, such as formaldehyde, n-hexane, n-methyl-pyrrolidone, toluene	Solvent



Household/Office Furniture

- Focus on specific classes of chemicals:
 - Flame retardants
 - Stain resistant chemicals (perfluorinated compounds)

- Examples:

- Bedding
- Seating and Sofas
- Fabric and Textile Furnishings
- Curtains



Potential Candidate Chemicals in the Household/Office Furniture Category

Chemicals or Chemical Classes	Functional Use
Chlorinated and brominated organic compounds, organophosphates	Flame retardant
Perfluorochemicals	Repellent (water-, oil-, stain-)



Cleaning Products

- Pathways for Exposure
 - Inhalation, Dermal, Aquatic
- Worker Exposure
 - 2.3 million custodial services workers
 - 1.4 million work hotel/healthcare facilities maids
- Hazard traits
 - Dermatotoxicity, respiratory toxicity, carcinogenicity
 - Work-related asthma



Cleaning Products

- Examples:
 - Air Fresheners
 - Detergents
 - Bathroom Cleaners
 - General-Purpose Cleaners
 - Carpet Cleaners



Potential Candidate Chemicals in the Cleaning Products Category

Chemicals or Chemical Classes	Functional Use
Alkyl phenol ethoxylates (APEs)	Surfactant
Hydrogen Fluoride	Anti-scaling agent
Phthalates	Emulsifier
Triclosan	Antimicrobial
Volatile Organic Compounds, such as n-hexane, methyl ethyl ketone, n-methyl-pyrrolidone, toluene, and xylene	Solvent



Clothing – chemical treatments

- Color fastness, wrinkle/stain resistance, and water repellency
- Manufacturing and laundering wastewater can contain Candidate Chemicals
 - Toxic
 - Bioaccumulative
 - Persistent
- Examples:
 - Sportswear
 - Sleepwear



Potential Candidate Chemicals in the Clothing Category

Chemicals or Chemical Classes	Functional Use
Alkyl-phenol ethoxylates (APEs)	Surfactant
Aromatic amines and azo dyes	Colorant, Dye, Pigment
Perfluorochemicals, formaldehyde	Water repellency Oil, stain, or wrinkle resistance
Phthalates	Plasticizer
Triclosan	Antimicrobial agent, Material Preservative



Fishing and Angling Equipment

- More than 1 million recreational anglers in California
- Various states and countries already have restrictions
- Lead hazards well-established
- Sensitive species and ecosystems
- Water bird mortality well-documented



Potential Candidate Chemicals in the Fishing & Angling Category

Chemicals or Chemical Classes	Functional Use
Metals	Strength, Density



Office Machinery (Consumable Products)

- Potential long term exposures for office and retail workers
- Life cycle concerns – downstream processing or disposal
- Examples:
 - Ink Cartridges
 - Thermal Paper
 - Toner cartridges



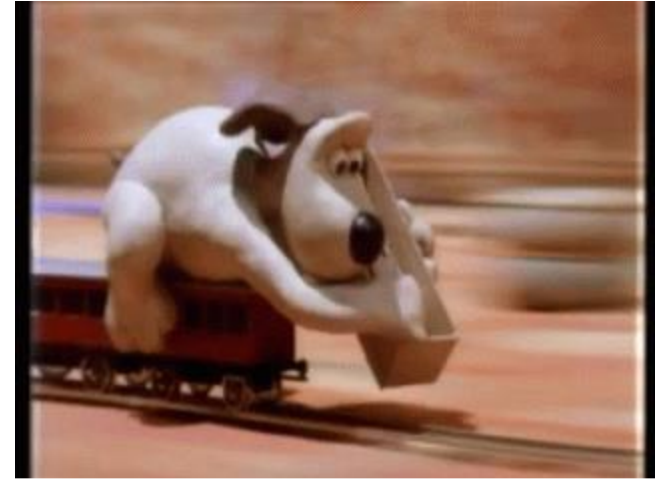
Potential Candidate Chemicals in the Office Machinery/Consumables Category

Chemicals or Chemical Classes	Functional Use
Azo dyes	Colorants
Bisphenols	Developer
Phthalates	Stabilizer, plasticizer
Volatile Organic Compounds such as hexane, toluene and xylene	Solvents



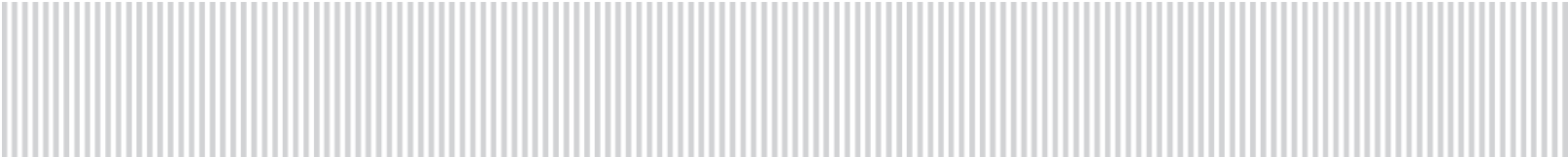
From Categories to Priority Products

- Still early
- No model exists, not a formulaic approach
- Can't be prescriptive



Questions?

anne.doherty@dtsc.ca.gov



Discussion

- Given the categories:
 - Which categories would you focus on and for which reasons?
 - *Example: Routes of exposure, types of chemicals in the group, etc.*
 - Which chemicals or products do you think need to be focused on that aren't already highlighted in a certain category?



Discussion continued

- Given the categories:
 - Which chemicals would you focus on from an environmental chemistry/toxicology perspective?





Priority Product Selection

Christine Papagni
Senior Environmental Scientist
NorCal SETAC Short Course
April 29, 2015



Department of Toxic Substances Control



Cal/EPA

The Goal

- Safer consumer products
- Asks the questions:
 - Is this chemical necessary?
 - Is there a safer alternative?
- Greater market opportunities for innovative companies



Not a Formulaic Approach

$$PP \neq \frac{c}{H_0} \int_0^z \frac{1}{\sqrt{\Omega_M(1+z')^3 + \Omega_k(1+z')^2 + \Omega_\Lambda}} dz'$$



Overview of Product Selection

- Priority Product work plan categories
- Review scientific information on adverse impacts and exposure
- Breadth of use of Product in California
- Sensitive subpopulations
- Extent of other regulatory authorities
- Evaluation of safer alternatives



Initial Three Priority Products Selected



**Children's Foam-Padded
Sleeping Products
containing TDCPP/TCEP**



**Paint Strippers
containing Methylene
Chloride**



**Spray Polyurethane Foam
Systems with MDI**



Outline of Identification and Prioritization Factors

- Key Prioritization Principles
- Identification and Prioritization Process
 - Adverse Impacts and Exposures
 - Adverse Waste and End-of-Life Effects
 - Availability of Information
- Other Regulatory Programs
- Safer Alternatives



Key Prioritization Principles

- Potential **exposure** to the Candidate Chemical(s) in the product

AND

- Potential for exposures to contribute to or cause **significant or widespread adverse impacts***

*adverse environmental impacts alone are sufficient



Information that May Indicate Significant Adverse Impacts

- Case-by-case basis
- Candidate chemical's toxicity profile
- Adverse impacts on sensitive subpopulations
- Adverse impacts on sensitive environmental receptors



Information that May Indicate Widespread Adverse Impacts

- Widespread use of chemicals or consumer products containing the chemical
- Chemical clean up or corrective action information from facilities
- A chemical's mobility in different environmental media
- Data indicating a chemical or its degradation products are present in solid waste, waste water, or storm water streams



Adverse Impacts Evaluated

In evaluating product-chemical combinations, DTSC evaluates the ***potential*** for the Candidate Chemical to contribute to or cause adverse impacts by considering ***one or more*** factor for which information is reasonably available



Adverse Impacts Evaluated (continued)

- Hazard Traits and Endpoints
- Aggregate effects
- Cumulative Effects
- Physicochemical Properties
- Environmental Fate
- Target populations
- A chemical's potential to degrade, form reaction products, or metabolize into another Candidate Chemical
- Structurally or mechanistically similar chemicals



Adverse Impacts Evaluated (continued)

- Target populations
 - Human
 - Aquatic
 - Avian
 - Terrestrial animal
 - Plant organisms



Adverse Impacts Evaluated (continued)

- Hazard Traits and Endpoints
 - Chapter 54 Green Chemistry Regulations
 - 4 Major Hazard Trait Categories
 - *Toxicological*
 - *Environmental*
 - *Exposure Potential*
 - *Physical*



Adverse Impacts Evaluated (continued)

- Hazard Traits and Endpoints
 - Toxicological (human health)
 - *Carcinogenicity, reproductive toxicity, liver toxicity*
 - Environmental
 - *Animal toxicity, loss of genetic diversity, phytotoxicity*
 - Exposure Potential
 - *Global warming potential, bioaccumulation*
 - Physical
 - *Explosivity, flammability, combustion facilitation*



Adverse Impacts Evaluated (continued)

- Aggregate effects
 - Effects from exposure to the same chemical from multiple sources or different consumer products
 - Example of DEHP
 - *Common phthalate plasticizer*
 - *Multiple exposure routes*
 - *Multiple product categories*



Adverse Impacts Evaluated (continued)

- Cumulative Effects

- Same effects from a chemical, along with other chemicals
- May also be synergistic effects
- DEHP example
 - *Consider adverse impacts of other phthalates or other chemicals with related adverse impacts*



Adverse Impacts Evaluated (continued)

- Physicochemical Properties

- May be used as predictive indicators of chemical behavior
 - *Vapor Pressure*
 - *Density*
 - *Solubility*
 - *Log K_{ow}*



Adverse Impacts Evaluated (continued)

- Environmental Fate

- Identifies chemical behavior and may predict exposure potential
- Can be determined through:
 - *Field and laboratory studies*
 - *Predictive models*



Adverse Impacts Evaluated (continued)

- A chemical's potential to degrade, form reaction products, or metabolize into another Candidate Chemical
 - Can be determined through:
 - *Measurement of degradation/reaction products*
 - *Computational modeling*
 - *In vitro bioassays*



Adverse Impacts Evaluated (continued)

- Structurally or mechanistically similar chemicals
 - May have similar tox profiles or environmental fate

- Example of Fire Retardants

Organophosphates with similar hazard traits

- *Tris or TDBPP*
- *Chlorinated Tris or TDCPP*
- *TCEP*
- *TCPP*



Special Considerations

- Sensitive Subpopulations
- Environmentally Sensitive Habitats
- Endangered and Threatened Species
- Environments Designated as Impaired



Exposure Potential Evaluation

- Market Presence
- Candidate Chemical in the product
- Product household and workplace presence
- Potential exposure during a chemical's life cycle
- Frequency, extent, level, and duration of exposure
- Containment of the chemical in the product
- Engineering and administrative controls
- Environmental persistence and accumulation

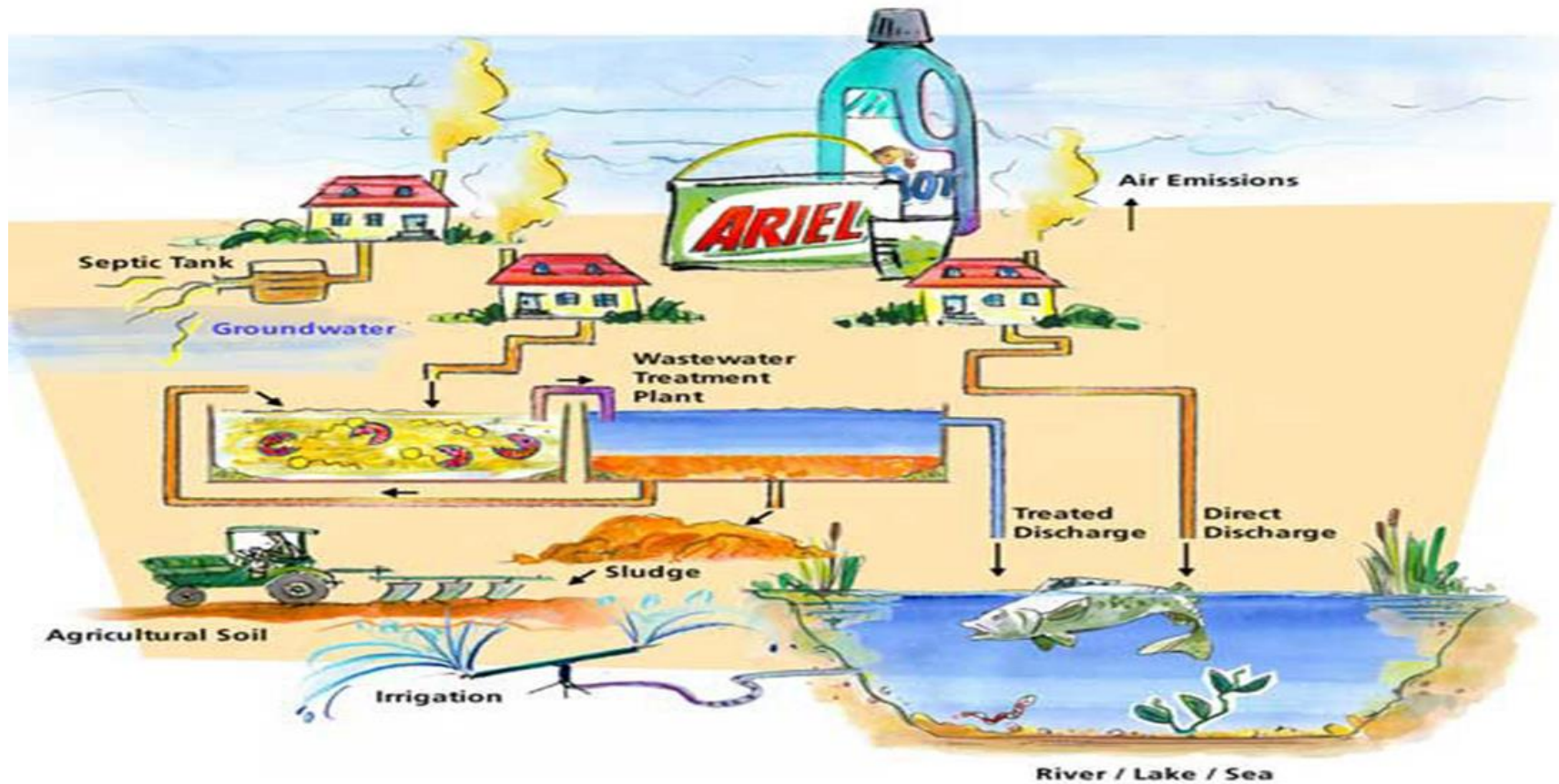


Adverse Waste and End-of-Life Effects

Waste materials and byproducts generated during a product's life cycle and resulting adverse effects



Adverse Waste and End-of-Life Effects



Availability of Information

Criteria DTSC uses to evaluate the quality of available information:

- 1) Level of rigor generating information and use of quality controls
- 2) Independently reviewed
- 3) Independently confirmed, corroborated, or replicated
- 4) Credentials, education, and experience
- 5) Is the information is relevant?



Other Regulatory Programs

- Review other laws and regulations related to chemical and/or product
- Evaluate whether they provide adequate protection against the ***same*** potential adverse public health and environmental impacts
- Ensure no duplicate or conflicting regulations



Are There Safer Alternatives?

Readily available safer alternatives

- Functionally acceptable
- Technically feasible
- Economically feasible



Milestones in Public Process

- Initial Proposed Priority Products Announced
- Proposed Priority Product Profile Reports
 - Added to DTSC website
 - Stakeholders informed via email
- Public Workshops
 - Verbal and Written Comments
- Updated information included in Priority Product evaluations



Initial Priority Products Revisions

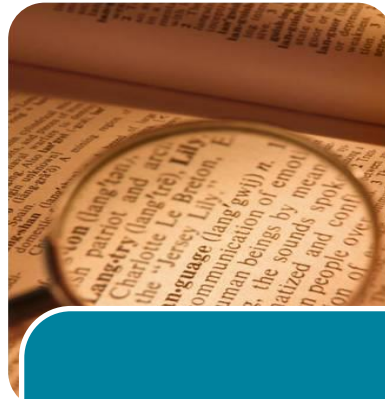
1. Children's Foam-padded Sleeping Products containing TDCPP
 - *Added TCEP*
 - *Added pillows*
2. Paint Strippers containing Methylene Chloride
 - *No surface cleaners*
3. Spray Polyurethane Foam Systems containing MDI
 - *Only unreacted MDI*
 - *Only two part foams*



Finalizing the Priority Products



Workshops
Meetings
Comments
Data/Information



Research
Q/A
Refinement
Dialog

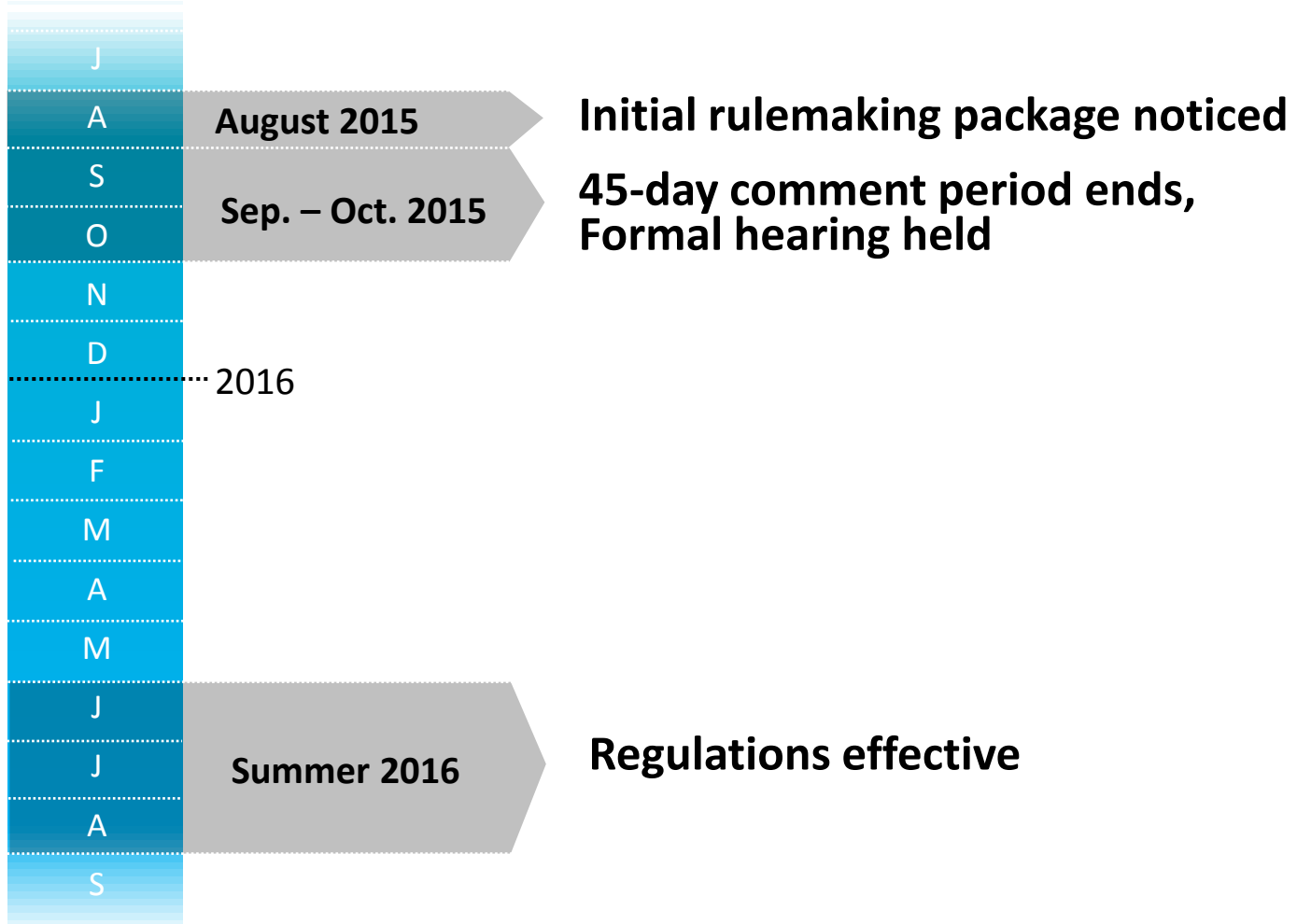


Rulemaking

- Supporting documents
- Formal comment period
- Formal hearing



Tentative Rulemaking Timeline



Questions?

cpapagni@dtsc.ca.gov



Discussion

- Given the categories:
 - Which categories would you focus on and for which reasons?
 - *Example: Routes of exposure, types of chemicals in the group, etc.*
 - Which chemicals or products do you think need to be focused on that aren't already highlighted in a certain category?



Discussion continued

- Given the categories:
 - Which chemicals would you focus on from an environmental chemistry/toxicology perspective?
 - Which product-chemical combinations would you name if you were in our shoes?





Alternatives Analysis

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Environmental Scientist
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Department of Toxic Substances Control



Cal/EPA

Alternatives Analysis

Compares the existing Priority Product with potential alternatives.

Answers key questions

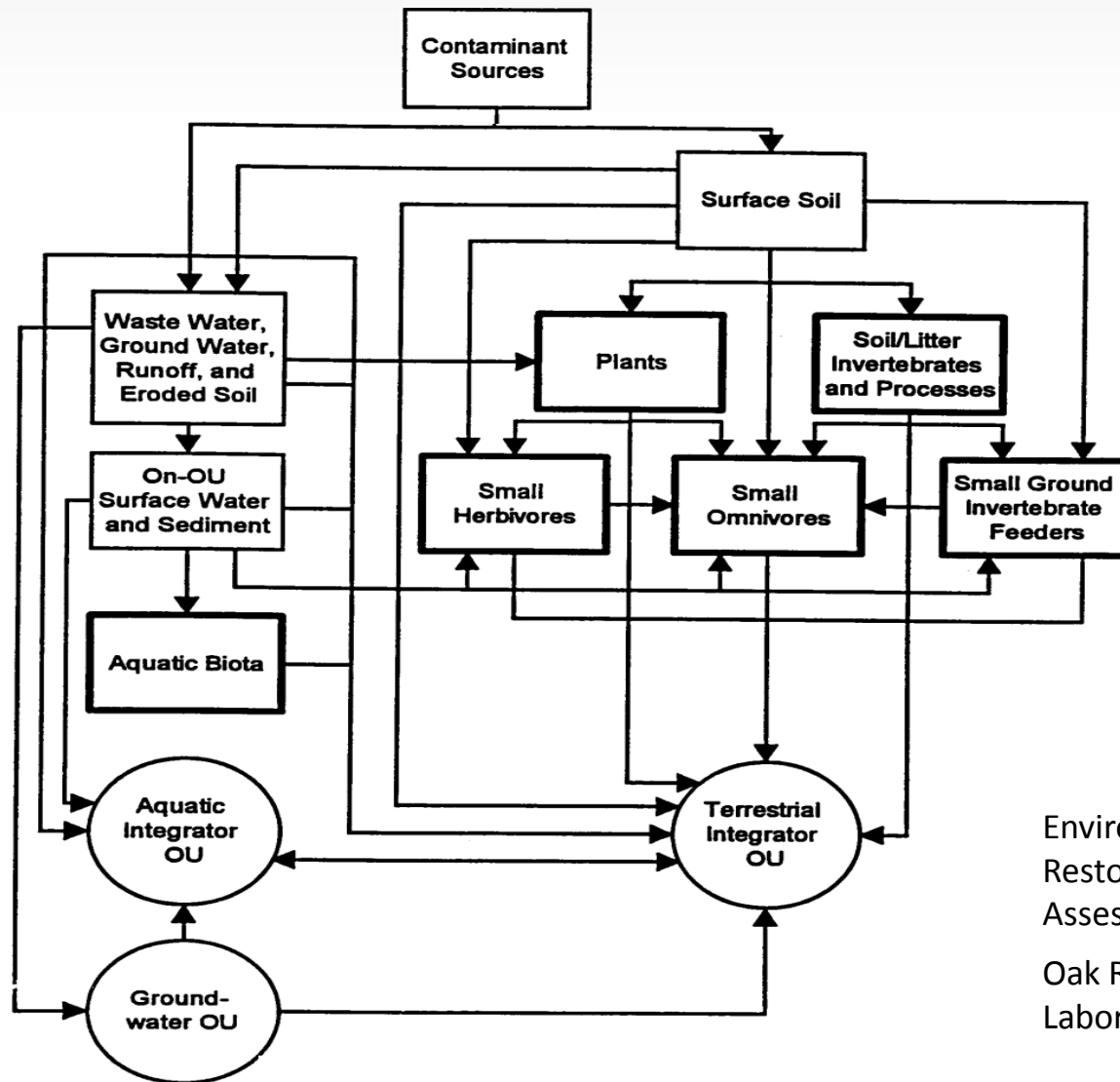
- Is it necessary?
- Is there a safer alternative?
- Have regrettable substitutes been avoided?



AA Process/Life Cycle Considerations

- Must consider the complete life of a product
- Informs regulated entity's decision and DTSC's regulatory response
- Examples (California Health and Safety Code 25253)
 - Materials and resource consumption
 - Water quality and environmental impacts
 - Air emissions





Environmental
Restoration Risk
Assessment Program
Oak Ridge National
Laboratory



Trade Offs Important to Consider

- Alternative may alleviate the original concern but may increase adverse impacts in other areas of the product life cycle
- Valuing tradeoffs is up to the responsible entity



Trade Offs Example: Spray Polyurethane Foam



- Initial Priority Product
 - Worker and DIYer exposure to diisocyanates during application
 - Sensitization, asthma, other adverse effects
- Particular concern for DIYers that may be using SPF without proper protection
- Projected future increase in SPF use



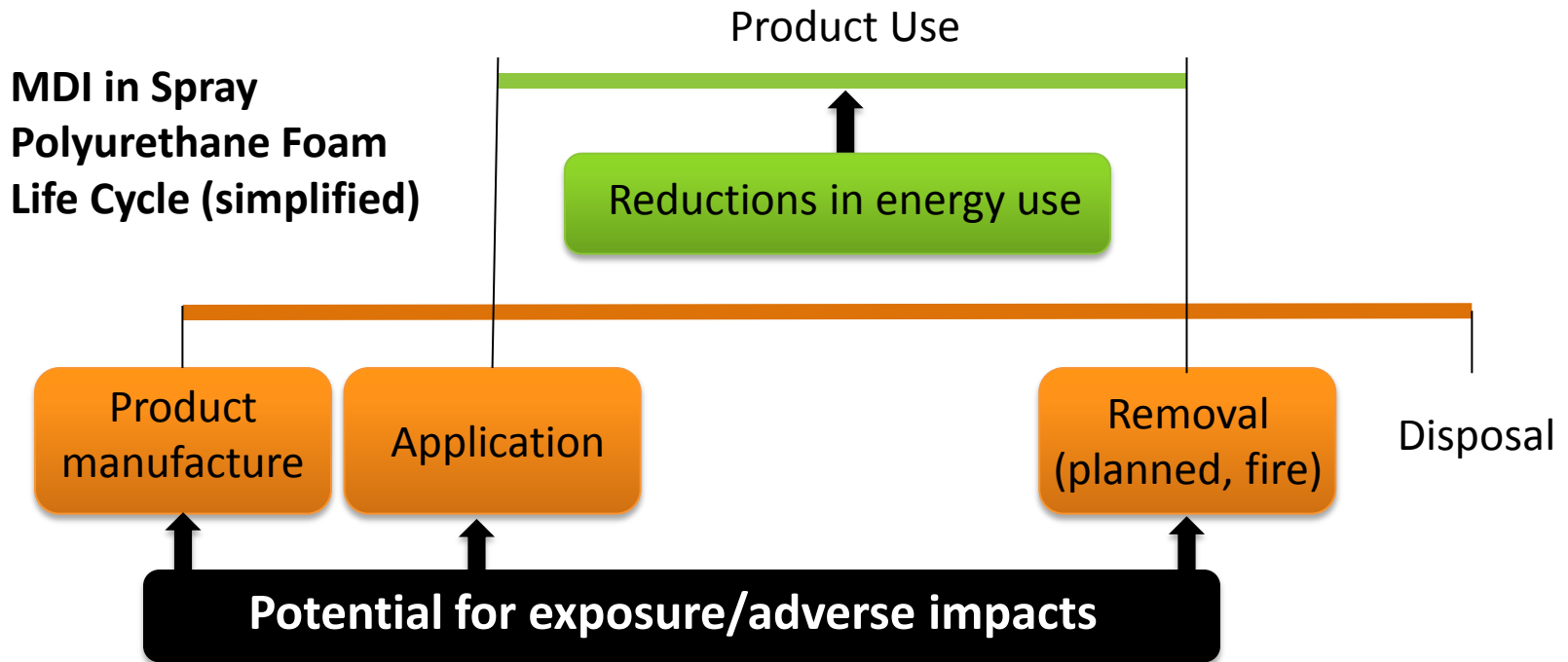
Trade Offs Example: Spray Polyurethane Foam



- California State Climate and Energy Program
 - New building standards (2008) mandated new construction reduce energy use by 15%
- DTSC informed of use of SPF to help meet the 15% energy use reductions demand
 - Superior insulation abilities
 - According to the manufacturers, SPF use can reduce heating and cooling energy load by 30-50%
- DTSC considering requirements as a part of the process



Trade Offs Example: Spray Polyurethane Foam



Manufacturers must consider these tradeoffs during the AA process



Alternatives Analysis Process

- At conclusion, the manufacturers will select an alternative chemical ingredient or alternative product design
 - May also decide to retain the existing product-chemical combination
- Must submit AA report to DTSC upon completion
- DTSC can then impose a regulatory response if needed



Alternatives Analysis



- Public process
 - All AA's will be posted to CalSAFER
 - Final AA's available for public comment
- Ensures transparency
- Allows others to use the information
- Responsible Entities can collaborate if they want



Questions?





SCP Research Needs

Anne-Cooper Doherty
Environmental Scientist
NorCal SETAC Short Course
April 29, 2015



Department of Toxic Substances Control



Cal/EPA

SCP Research Needs

- Research and data generated by academia, government, industry and NGOs can help SCP in our process
- Research can help:
 - Prioritize
 - Evaluate potential
 - Strengthen arguments
- Need evidence of exposure, adverse impacts



SCP Research Needs

- Monitoring studies (including California specific)
 - Aquatic environments, indoor environments, sensitive subpopulations, biomonitoring
- Contaminant source information
 - Product-specific source information
 - Changes in use, emerging contaminants
- Environmental fate of contaminants



SCP Research Needs

- Long-term animal studies
- Studies on endpoints, including:
 - Endocrine disruption
 - Obesity
 - Developmental and reproductive toxicity
- Metabolite toxicity studies
- Sensitive sub-population studies



SCP Research Needs

- Epidemiological research
- Methods and approaches for filling data gaps*
- Methods and approaches for comparing chemicals with varying amounts of data*



SCP Research Needs

- Identification of product categories most important for human or environmental exposures
 - Link between exposure and products
- Methods for proper assessment of “pseudo-persistent” chemicals
- Conceptual environmental exposure models for use in AA





Past Regulatory Success

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April 29, 2015



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Cal/EPA

Past Success: Environmental Data

- Phase outs of chemicals, either voluntarily or through legislative action, can reduce environmental exposures
- Detecting these reductions is part of the wealth of environmental research data needed
 - Before and after data



PBDE's in San Francisco Bay

ENVIRONMENTAL
Science & Technology

Article

pubs.acs.org/est

Declines in Polybrominated Diphenyl Ether Contamination of San Francisco Bay following Production Phase-Outs and Bans

Rebecca Sutton,^{*,†} Margaret D. Sedlak,[†] Donald Yee,[†] Jay A. Davis,[†] David Crane,[‡] Richard Grace,[§] and Nirmela Arsem^{||}

DOI: 10.1021/es503727b

Environ. Sci. Technol. 2015, 49, 777–784



PBDE's in San Francisco Bay



- Use began in the 1970's
- Unusually high levels of PBDEs in San Francisco Bay
 - Forster's tern eggs (2002) had the highest level of PBDEs in biota reported at the time: 63,300 ng/g of lipid
- Nationwide phase-outs and state bans shortly thereafter



PBDE's in San Francisco Bay

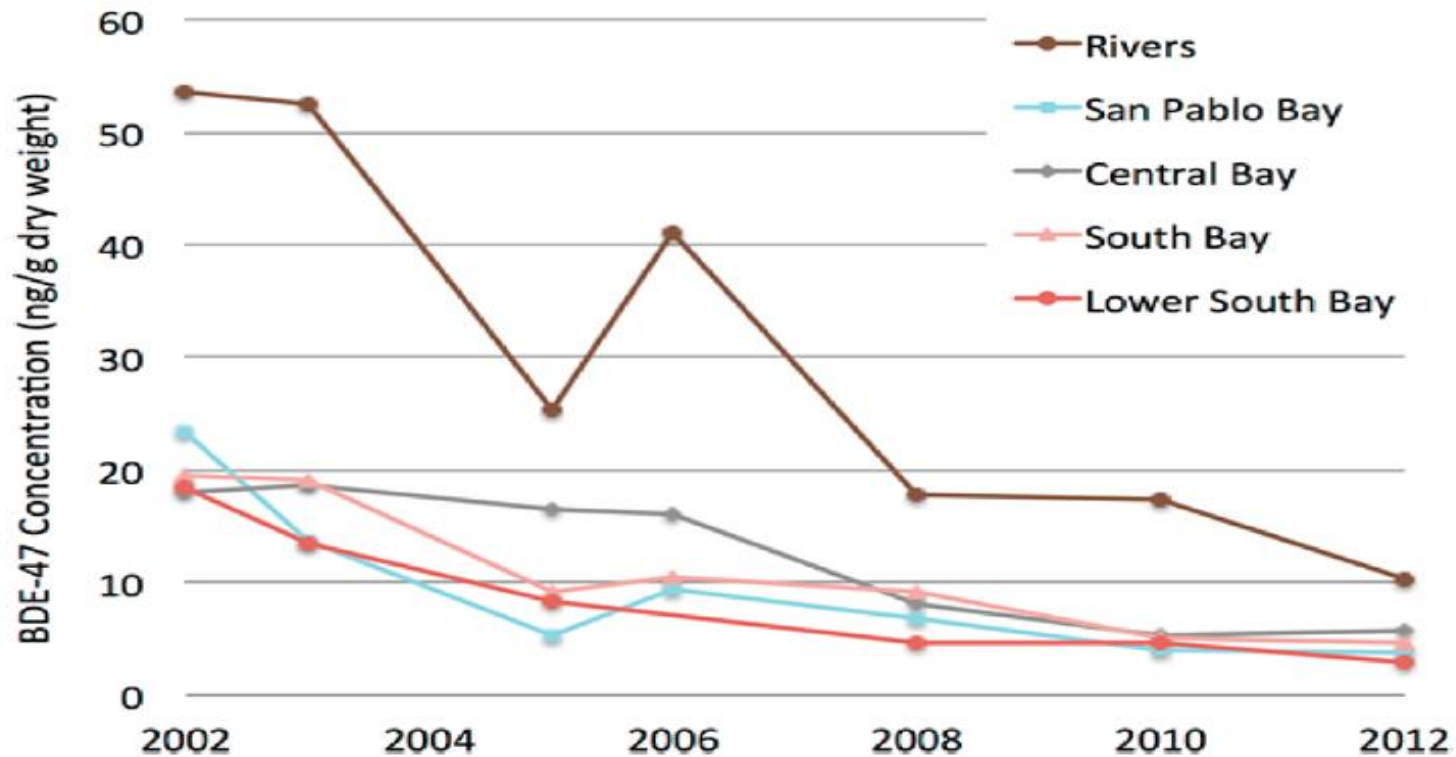


Figure 5. Concentrations of BDE-47 in bivalves (ng/g dry weight).



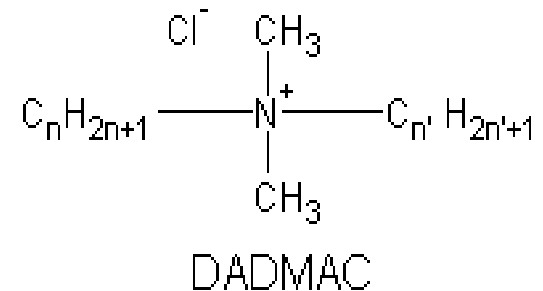
PBDE's in San Francisco Bay

- Study provides:
 - Monitoring data/aquatic exposure data
 - Evidence for trends in use of the chemical
 - Evidence that phase outs/bans of chemicals can result in meaningful reductions in aquatic exposures



QACs (DTDMACs) in New York

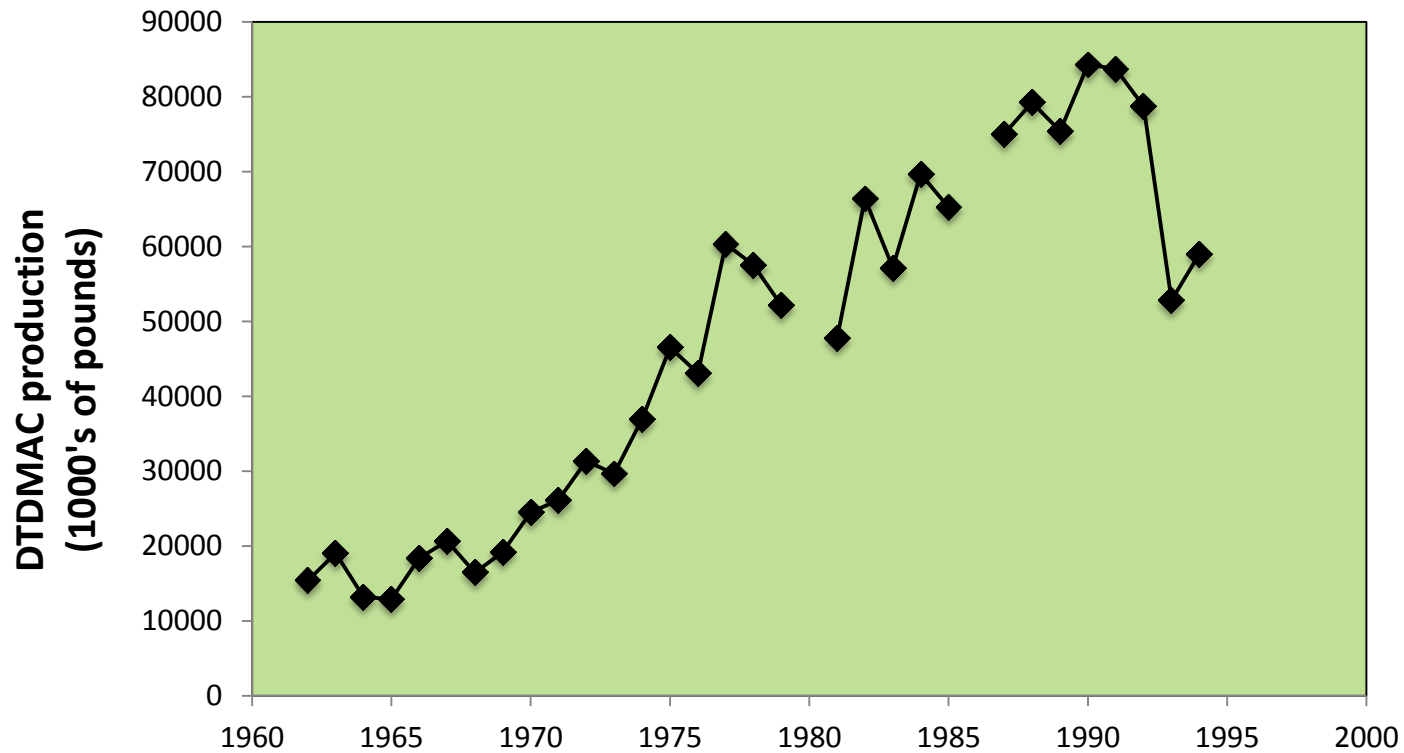
- DTDMACs: a type of quaternary ammonium compound (QAC), surfactant
- Production increased from the 1950's to a peak in the late 1980's before a voluntary phase out in Europe
 - Levels of DTDMACs in sewage sludge in Europe of **2-8 mg/g**



$n, n' = 8, 10, 12, 14, 16, 18$



DTDMAC Production



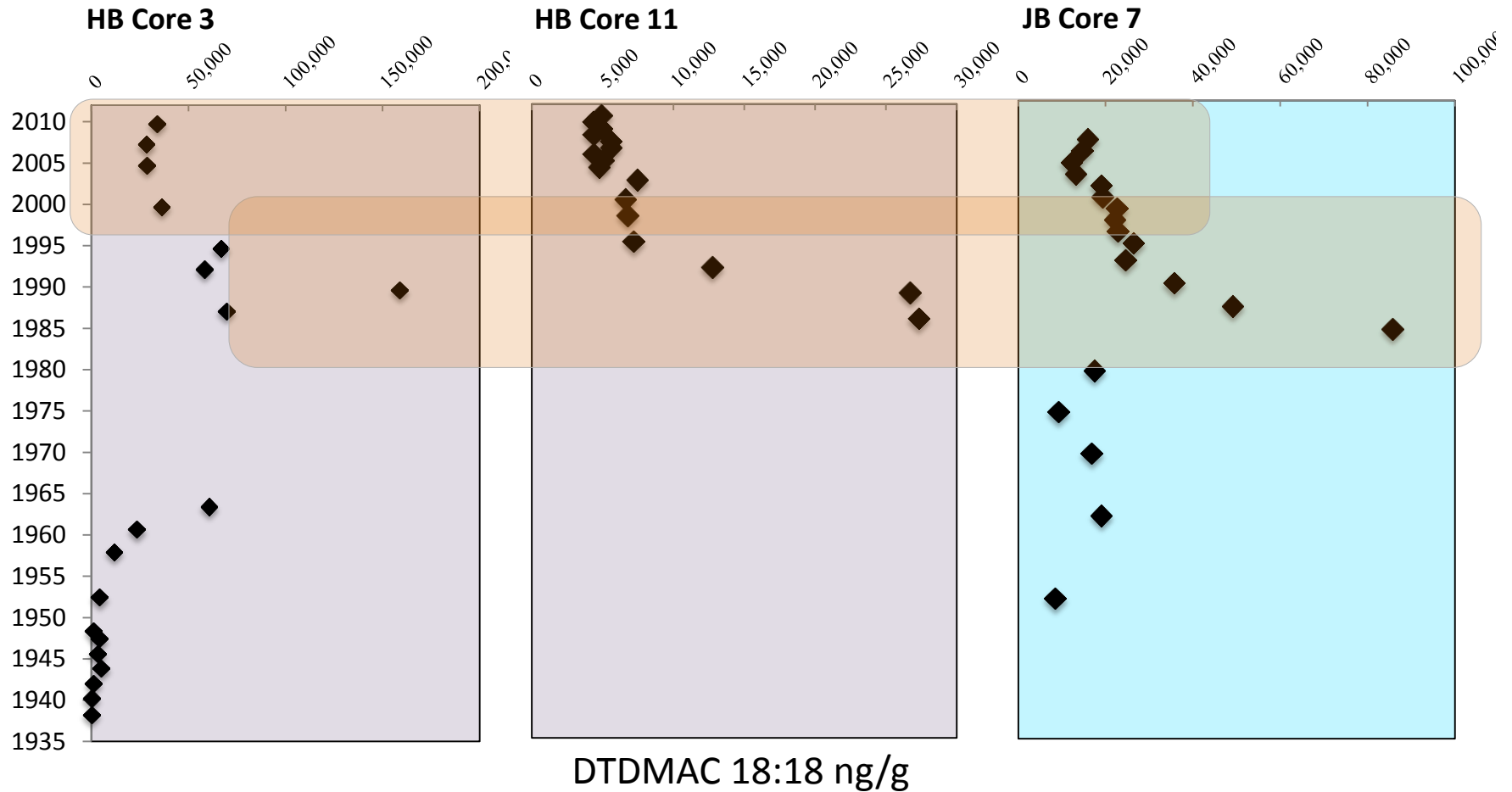
US International Trade Commission Data (ended in 1993)



DTDMAC in Sediment Cores

Hempstead Bay, NY

Jamaica Bay, NY



Doherty PhD Thesis, 2013



QACs (DTDMACs) in New York

- Environmental data indicates:
 - Past environmental exposure of the chemical
 - Trends in the use of the chemical
 - Phase-outs outside of the region can have impacts on environmental concentrations
 - Use of DTDMACs in the U.S. continues at very high levels



THANK YOU! QUESTIONS?

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